

ABSTRACT OF THE DISCLOSURE

There is disclosed a semiconductor sensor for measuring the contact shear stress distribution between the socket of an above-knee (AK) prostheses and the soft tissue of an amputee's stump. The sensor is fabricated by the micro-electro-mechanical system (MEMS) technology, and its main sensing part is a 2-X shaped with a flange structure. The sensor is prepared by anisotropic wet etching of bulk silicon in KOH solution and a square flange above the sensing diaphragm is formed through surface micromachining of deposited SiO₂ thin film. This invention has the following characteristics: piezo-resistivity of the monolithic silicon will be utilized to convert shear deformation of the sensor into an electrical signal and a micro sensor which can measure the shear force vector acting on the sensing flange.